800145MP

DESCRIPTION OF MANHEIM GROUP BOTTOM SAMPLES, GYRE
CRUISE 80-~~05~~ 60 JUNE 24-JULY 5

AREA I: West of DeSoto Canyon, possible phosphorite accumulations in Pleistocene reef trend.

P-1: 29°20.0' N, 87°43.2'W, Box Core No. 1, 174 m.
02 cm: Green shell has, medium-coarse with microgastropods, pelecypods, forams (benthic and planktonic), spicules, much glauconite in the form of foraminiferal molds; minor quartz. No significant phosphate reaction.

2-4 cm: White-green-gray sand size shell hash with abundant benthic and planktonic forams and glauconite grains. Exact mold of Turborotalia inflata (Pleistocene-Holocene), .5 mm, noted; also, glauconite pores in echinoid plate.

4-6 cm: White-green-gray coarse shell sand with large aggregates (to 1 cm) carbonate-cemented masses with greenish glauconite admixtures. Little quartz but much glauconite, dark green. No phosphate reaction, but see note.

6-8 cm: White to gray-green, shell carbonate sand with molluscan hash, 2-10 mm, roughly equal proportions of benthic and planktonic foraminifera and bryozoans.

8-10 cm: as above, with heavy planktonic association and juvenile molluscs. Globigerinoides ruber (red variety, typical warm water subtropical).

10-12: Gray-green, silty carbonate sand, fine-medium width, sand-size glauconite grains, chiefly molds of forams.

12-14 cm: As above, irregular angular fragments of shell and glauconite.

14-16 cm: As above, but finer-grained, silty.

16-18 cm: As above, very fine sand to silt, clayey.

18-26 cm: Green-gray silty to sandy clay with shell debris and glauconite grains.

P-2: SM-1 Smith-McIntyre gray (SM-1), 29°20.94', 87°43.48', 170m;
SM-1 Gray-greenish brown carbonate silt, with fine shell hash and benthic
SM-1A foram fragements, fine glauconite chips. Irregular rock chunk, 10x6x4 cm cemented carbonate, gripped by bottom jaws; recovered 15 cm. No phosphate*.

*. Glauconite, when treated with 20% nitric acid, turns yellowish green, and color persists when molybdate is added, but the characteristic phosphate yellow color is not obtained. This may be the reason why Bart Bridsall erroneously reported phosphate in dark grains in this reef trend.

P-3: Box Core #1. Jaws failed to close and jammed box, 29°26.26', 87°35.15', 1740 hours. 75 m depth, current direction 193°, speed 1.6 knots on bottom, start up 1980, 1.2 knots. 29°26S, 87°35.14', 1835, June 17, 75 m. ~~SM-1~~ failed to trigger

SM-2 SM-2 29°26.26', 87°35.20', 1809, 80 m sonic, 81 wire. Recovered 8 cm well-washed, coarse carbonate skeletal fragments, iron-stained.

P-4: Box core 29°40.56', 87°37.04', 2102, 40 m sonic, 37 wire. Recovered 14 cm with good top, but lost some bottom sediment very clean, well-sorted medium sand, rounded with trace of carbonate, top. 1.5 ~~m~~ cm iron-stained; Holo-age based on planktic forams. Acoustic surveys show sand waves 2 m in amplitude. Lithology same in top 2[illegible] cm and 6-10 cm. Coralline algae, gray; bivalve, benthic forams such as Barbatia, Turbinella, gastropods Caecum, Lima Columbellids, scaphopods; many carbonate grains are stained orange. These may be Birdsall "orange" coated grains. There may be a slight phosphate test on these particles, if so, this may be attributable to coprecipitation of phosphate with iron, alaberner, and definitely not phosphorite.

P-5: 18 June 1980. One box core 29°35.55', 87°, 2018, 110 m depth, 14 cm.
0-4 cm: Gray-brownish clayey silt, with coarse sand-size carbonate fragments and chunks (molluscan debris?), brown-cream, well-preserved benthic forams and scarcer glauconite.

4-9 cm: Carbonate, gritty, shell hash and aggregated chunks, silty in part; abundant benthic forams.

9-14: As above.

FINAL NOTE: The reef pinnacles appear to consist of carbonate shell fragments along with dark blue-green-gray clay, all cemented together and encrusted with perpulid worm tubes.

I conclude provisionally that there is no evidence of apatite enrichment at the paleoreef ridge or landward or seaward of it. The report by Birdsall may have confused glauconite and iron-staining for phosphorite.

PORE WATER EXTRACTIONS OF LARRY DOYLE'S PISTON CORES (CORE CATCHERS)

Note: Salinities by refractive index are only approximations; typically, .2 to .4 o/oo larger values are obtained by inductive salinometer. However, relative variations are usually meaningful.

	Location				$S_{ref.}$	
Station	Lat. (N)	Long. (W)	Depth (m)	Rec. (ft)	(o/oo)	Cl
1	28°59.'	88°05.'	1270	29	35.2	19.5
2	29°00.'	87°36.'	1792		34.4	19.4
3	28°18'	87°01'	1193	22.5	34.8	19.5
4	28°18'	86°49'	945	32	34.7	19.5
5	28°18'	86°36'	808	32	35.0	19.5
7	28°18'	86°12'	597	32	35.1	19.7
8	28°18'	86°00'	495	21	35.3	19.5
9	28°18'	85°47'	400	32	35.5	19.8
13	27°51'	85°16'	528	25	35.5	19.7
14	27°51'	85°31'	757	35	35.3	19.8
15	27°51'	85°46'	1108	29	34.9	19.5
16	27°50.4'	86°00'	3154	16	37.0	$\geq$ 20.7
17	27°51'	86°15'	3171	26	36.7	> 21
18	27°51'	86°36'	3045	24	32.3	19.3
19	27°51'	86°00'	2963	30	34.3	19.6
20	27°22'	86°60'	2983	30	37.0	19.8
21	27°21.4'	86°36'	3085	31	36.3	19.4
22	27°22'	85°15'	3190	22	35.8	19.7
23	27°22'	85°45'	3247	20	36.0	20.5
24	27°22'	85°30'	2850	30	35.4	19.6
26	27°22'	85°09'	770	30	35.4	19.8
27*	27°22'	85°02'	488	32	35.4	19.6

*Examination of core catcher from this core showed evidence of phosphatic, dolomitic, quartzose rock, suggesting it may represent outcroppings of phosphatic middle Tertiary strata.

PHOSPHATE AREA II (OFF PINELLAS COUNTY, ST. PETERSBURG, FLORIDA)

Drill Site #1

27°50.96' 83°02.05', 11 m. Recovered 61 cm of sediment. Surface sediment by diver. Pepper and salt, shelly quartz sand with quartz 1/16 to ½ mm many benthic forams. Strong phosphate test indication associated with rounded brown to gray-brown, or yellowish amber grains, vitreous looking. Shells to 1 mm. Also, gray-black stained carbonate, and banded gray-black dolomite. Similar sediment obtained in top 3 cm of drill core, which was distributed along rest of core by sloshing. Especially noted: Peneroplis proteus?

3-8 cm: Hard, cemented, irregular top surface with black staining topped with .2-.5 mm thick, brown phosphatic layer. Grayish speckled carbonate rock with pinhole to arcuate vugs throughout. Inliers of cream, pure carbonate grains to 3 mm wide; rest of carbonate rock very sandy; all more or less phosphatic (restricted polished grains). No identifiable fossils, but many curved, polished carbonate grain surfaces reminiscent of micromollusc shell interiors. A few buff dolomite fragments, recognized by low effervescence with acid.

8-14 cm: White, cemented, sandy limestone with phosphatic darker grains. Fewer grains of quartz (still sand, fined-sized).

15-20 cm: White speckled, sandy limestone, hard, heavily microvugular with .1-5 mm cavities. Very well-rounded quartz and phosphorite grains, subangular towards bottom. Frequent arcuate, thin cavities (bladed).

20-23 cm: Hard, buff-speckled, sandy microvugular phosphatic limestone; top with rounded quartz grains, bottom subrounded. Arcuate and blade-like cavities. Sand fine-grained.

23-25 cm: As above, veined with pure carbonate. Vugs appear to be chemically dissolved channels rather than cavities due to leaching of carbonate organisms.

25-28-33 cm: As above.

33-36 cm: As above; 33-mm vug with bladed walls

36-39 cm: As above.

40-43 cm: Buff, sugary, sandy, sparsely microgugular dolomite with occasional phosphorite speckles (rounded grains), considerably denser than previous samples owing to lesser porosity. Strong phosphate reaction.

44-50 cm: Very hard, buff, sandy dolomite, sugary texture, microvugular, with specks of apatite grains.

50-51 cm: As above.

51-54 cm: Hard-buff, microvugular sugary dolomite with very fine-grained quartz sand, speckled with apatite.

54-61 cm: As above.

Total recovery: 61 cm.

All above samples showed phosphate reaction. No organisms discernable.

Drill Site #2, approximately 27°51', 83°28' depth about 30 m. Seas too high to try drilling.

GC-2 — "pseudo-dart" corer from "2" steel pipe, hardened cutting edge, 170-lb weight, no valve, lowered at 150 m/sec. 27°49.70, 83°33.09, core 1 failed. Core 2 recovered 3" of brown-gray, fine silty-clayey foraminiferal mud with glauconitic streaks. No phosphate reaction on initial test.

SAMPLE #SM-3 — Smith McIntyre grab no. 1, 27°51', 83°28', but later check showed that cruise track may have been somewhat farther south than this position. Green-gray, highly calcareous fine quartz sand, much glauconite and stained carbonate (grayish).

sample SM4 — Smith McIntyre #2. 27°50.44', 83°27.84', green gray silty, very fine-grained, carbonate-quartz sand, half with quartz less than 25% glauconite. Later examination under microscope revealed dark "dolomitic" grains, one with phosphorite:

0-2 cm: Green, fine silty carbonate sand, with quartz
2-5 cm: Very fine, silty carbonate sand with large glauconite mixture.

5-8 cm: Greenish-gray speckled carbonate sand with minor quartz; dark grains due to black-gray stained carbonate.

12-18 cm: As above.

sample SM-5 — Smith McIntyre #3: Small valley indicating loss of some sediment layers noted in adjacent sites. 27°50.83', 83°31.25'. Dark-gray speckled carbonate sand with many benthic forams and black-stained "dolomitic grains" - scarce glauconite. No phosphate test.

<u>Summary of Chuck Holmes' underway sampler samples - test for Phosphorous</u>

#7 contains gray "dolomite", fizzes slowly but not as slow as normal dolomite. None of samples tested showed phosphate presence. Black specks are stained carbonate, shells of uncertain origin, and in some cases, "dolomite"?. Color removed on heating in propane torch.

FRESHENED WATER CONDITIONS IN THE EASTERN GULF OF MEXICO

F.T. Manheim, P.C. Bowker, R. Hall and F. Manley

The cruise was not intended to investigate hydrologic properties, but in conjunction with a check on surface water for calibration with pore fluid salinities, a highly unusual, lowered salinity was found near coring sites 3 and 12. We subsequently took surface water samples as frequently as feasible, considering the other duties on the cruise, and improvised deeper hydrocasts on three coring sites to determine the depth of the freshened water.

Our salinities were performed on the Bissett-Berman Salinometer after preliminary rough checks by refractive index. It functioned excellently and our data is believed to be accurate to within .01 o/oo in most cases. Surface temperatures were determined by on-bucket samples. These fluctuated depending on time of day, rainfall, and latitude from 27.2° to 31.2°C and tended to be lower in the most freshened water (see below).

The freshened water formed a belt following the SD&L special "Loop" current pattern, predicted by the June 1980 current predictor, published by Defense Mapping Agency Hydrographic Center in a gyre moving along the continental slope southward and around the Florida Peninsula. The freshest waters were approximately 32.8 o/oo at Latitude 28.5°N, and gradually became saltier southward, but still remained below 34.5 off the Florida Keys. They were frequently concentrated in the bathymetric range of 200-500 m, but large masses of mixed waters bulged well into the West Florida Shelf. In the Inner Shelf, and in the central Gulf, salinities were greater than 36.0 o/oo.

Our hydrocasts near the latitude of St. Petersburg-Tampa indicated that the main freshwater body was about 5-6 m in depth. and gradually mixed to about 20-25 m.

Current measurements showed a persistent NW or N-to-SE pattern within the fresh zone, with various eddies and mixed current patterns on either side of the belt.

We thank our colleagues, especially Mate Tim Nelich and Carol Blanton for valuable help. We also thank Theo Duis for helping us construct the special "Manheim-Duis" mini-water sampler.

Time (GMT)	S o/oo sal.	S o/oo ref.	T°C	Location Lat. (N)	Long. (W)	Depth (m)	Current Direction	origin speed (knots)
6/18/80								
1700 surf.		36.0	-	28° 18'	87° .01'	1193		
Note: On entering deep water (slope) S and E of Mississippi Delta, found strong eastward current drift causing ship deviation from course (N-S); toward 1600 m deviation decreased; no quantitative data at this time, but loop current influence assumed.								
6/19/80								
1737	32.86	32.3	"warm"	28° 16.9'	85° 15.5'		NW	1
1750	32.80	32.4	"	28° 17.0'	" 14.9'		NW	½
1805	32.83	32.4	"	28° 17.3'	" 13.3'		N-NW	1.00
1815	-	-	-	-	" -		N-NW	.95
1830	-	-	-	" -17.86'	" 11.25'		N-NW	.67
1837	32.85	32.8	-	" 18.1'	" 10.3'			
1845	-	-	-	" 18.28'	" 9.87'		N-NW	.6
1855	32.88	32.7	-	" 18.6'	" 9.0'			
1900	-	-	-	" 18.7'	" 8.57'		N-NW	.54
1909	32.86	32.8	28.1	" 19.0'	" 7.7'		N-NW	.36
1915	-	-	-	" 19.19'	" 7.2'		N-NW	.36
1930	-	-	-	" 19.7'	" 5.83'		N-NW	.27
1937	32.81	32.6	28.0	" 20.0'	" 5.1'		N-NW	.24
2005	32.72	32.4	27.8	" 20.9'	" 2.4'	150	N-NW	.31
2034	32.71	32.4	27.9	" 21.3'	84° 59.6'	130	N-NW	.3
2104	33.05	32.7	28.1	" 21.06'	" 56.6'	110	314°	.3
2135	32.88	32.6	28.1	" 22.1'	" 53.1'		301°	.1
2205	33.12	32.7	27.8	" 22.39'	" 50.84'	83	351°	.3
2242	33.74	33.5	28.0	" 22.8'	" 47.2'			
2305	34.16	34.1	27.8	" 23.1'	" 45.0'	70	0°	.2
2343	34.33	34.2	27.8	" 23.6'	" 41.4'	71	350°	.1
6/20/80								
0017	34.28	34.1	27.8	" 23.6'	" 38.1'		negligible	
0107	34.09	33.9	27.8	" 24.7'	" 33.3'	65	0	
0136	34.47	34.0	27.8	" 25.1'	" 30.3'	72	WNW	.5
0205	34.30	34.0	27.6	" 25.7'	" 27.0'	63	WSW	.7
0234	34.21	34.0	27.5	" 26.2'	" 23.8'	60	W	.9
0303	34.24	34.0	27.6	" 26.6'	" 20.4'	60	WNW	.0
0404	34.76	34.5	27.6	" 27.5'	" 15.3'	43	W	.9
0453	35.10	34.9	27.6	" 28.5'	" 07.5'	45	W	.9
0500							NE	1.1
545	35.36	34.8	27.6	" 33.07'	" 08.51'	42		
0700	34.96	34.6	27.4	" 36.66'	" 13.65'	42		
0805	34.60	34.2	27.3	" 35.85'	" 20.47'			
0955	33.85	33.3	27.6	" 36.46'	" 30.1'	57		
1100	34.04	33.7	27.6	" 40.42'	" 26.9'	63		
1200	34.64	34.4	27.5	" 41.29'	" 19.35'	43		
1300	34.57	34.4	27.5	" 38.14'	" 15.83'	35		

Time (GMT)	S o/oo sal.	S o/oo ref.	T°C	Location Lat. (N)	Location Long. (W)	Depth (m)	Current Direction	origin speed (knots
1416	34.61	34.4	27.6	28° 30.2'	84° 15.2'	45		
1503	34.61	34.3	27.6	" 25.1'	" 14.8'			
1615	34.30	33.9	27.7	" 21.7'	" 17.8'	53	N	1.1

Note: S_{sal} = Salinity by Bisset - Berman inductive salinometer. S_{ref} by handheld temperature-compensated refractometer. Currents and dir. est. from ship heading; Loran-based speed and direction and other estimates by pilots.

6/20/80

1702	34.45	34.4	27.7	28° 19.0'	84° 22.4'	63	NNW	.52
1730							NNW	.21
1809	34.68	34.5	27.7	" 15.3'	" 28.8'	70	NNW	1.2
1914	34.91	34.5	27.6	" 10.5'	" 33.4'	74	NNW	1.2
1945							from NNE	
wind speed 20 km from W, increasing wave heights								
2005	34.86	34.4	27.5	" 07.4'	" 37.3'	83		
2046	34.90	34.7	27.3	" 05.4'	"40.29'	90		
2125	34.01	33.8	27.5	" 03.33'	"43.61'	122	351°	1.2
2200	33.14	32.7	27.5	" 01.43'	" 46.3'	150	342°	1.4
2255	32.97	32.6	27.45	27 58.44'	"	212		

6/21/80

0043	33.06	32.7	27.4	" 51.7'	" 59.4'	311		
0131	33.93	33.7	27.3	" 48.2'	85° 03.3'	364		
0207	33.73	33.7	27.3	" 44.5'	" 05.7'	427		
0304	33.20	32.8	27.4	" 39.2'	" 09.9'	534		
0407	33.61	33.7	27.2	" 33.2'	" 04.1'	744		
0502	33.00	32.9	27.5	" 27.7'	" 16.7'	871		

Sta. 25 hydrocast

0700	33.00	32.5	27.5	" 22.29'	"19.77'	1035	1 Surface	50.
	33.2			"	"		4 m depth	
	35.3			"	"		8 m depth	
	35.6			"	"		15 m depth	
	35.8			"	"		25 m depth	
0855	33.27	33.5	27.4	" 22.89'	"11.65'	816		
0915 (26)	33.35	33.5	27.4	" 22.34'	"09.09'	766		
1100 (27)	33.56	33.5	27.2	" 22.1'	"02.5'	525		
1438 (25)	34.58	34.3	27.4	" 21.9'	"20.5'	1109		
1602 (24)	35.62	35.6	27.0	" 22.1'	"30.2'	2700		
2000	35.89	35.9	27.5	" 21.2'	"35.6'	3245		
2200	35.43	35.2	27.6	" 21.99'	"43.65'	about 3200		

6/22/80

0209	35.80	35.5	faucet	" 21.9'	86° 00.7'	1333		
0425 (22)	35.88	35.8	27.6	" 21.6'	"15.0'	3190		

Time (GMT)	S o/oo sal.	S o/oo ref.	T°C	Location Lat. (N)	Long. (N)	Depth (m)	Current Direction	origin speed (knots
0715 (21)	36.72	35.7	27.75	27° 21.9'	86° 35.64'	3085	50°	.5
1240							90°	1.4
1540							138°	.4
1631 (19)	35.07	35.2	27.2	" 51.4'	87° 00.2'	2963		
1830	34.13	34.2	27.5	" 52.8'	" 46.3'	2948		
1848	34.25	34.1	27.3	" 52.50'	" 42.00'	2952	little current	
2000 (18)	34.11	33.7	27.9	" 51.2'	" 35.7'	3048	142°	.5
Hydrocast		34.4	6 m with angle of 20 = 5.6				140°	.5
		36.2	10 m with angle of 40 = 7.7					
2355 (17)	33.88	34.0	27.5	" 50.6'	87° 15.2'	3170		
6/23/80								
0329	(heavy rain probably influences the following sample:						38°	1.0
0450 (16)	32.75	32.4	27.1	" 50.66'	86° 00'	2925	38°	.7
0715	34.15	34.0		" 50.84'	85° 49.9'	1270		
0825	34.19	34.0		" 50.73'	" 45.73'	1093	90°	.2
1345	32.8	33.32		" 51.12'	85° 24.01'		west	
1415		33.19		" 51.03'	" 19.00'	590		
1500 (13)	32.7	33.14		" 51.1'	" 15.9'	528		1 kn.
Hydrocast								
4 m	32.7							
7 m	34.0?							
13 m	35.4							
19 m	35.3							
1738	32.5	33.14	28.1	" 50.7'	" 09.2'			
1805	32.7	33.02	28.2	" 50.7'	" 06.7'	405		
1906	32.6		28.3	" 50.7'	84° 59.4'	295		
1944	32.5	32.87	28.4	" 50.8'	" 54.5'	260		
2025	32.6	32.94	28.6	" 50.7'	" 49.5'	210		
2100	32.8	32.92	28.3	" 50.6'	" 45.4'	165		
2150	32.7	33.12	28.4	" 50.9'	" 39.6'	140		
2240	33.4	33.62	28.0	" 51.4'	" 35.2'	100		
2314	33.0	33.74	28.2	" 51.6'	" 29.8'	75		
2335	33.8	33.89	28.3	" 50.8'	" 19.7'	75		
6/24/80								
0000							015°	.4
0040	34.0	34.19	28.1	" 50.8'	" 19.7'	75		
0122	34.4	34.72	28.5	" 51.1'	" 14.7'	75	020°	.4
0202	34.3	34.64	28.0	" 51.3'	" 09.8'	65	040°	.7
0251	34.3	34.47	28.1	" 50.9'	03.8'	60	030°	.6
0327	34.4		28.0	" 50.6'	83° 59.4'	50	033°	1.0
0454	35.3	35.35	27.6	" 50.7'	" 49.6'	85		
0400							021°	1.3
0430							021°	1.5
0500							034°	1.4
0515							050°	1.6
0530							075°	1.0

Time (GMT)	S o/oo sal.	S o/oo ref.	T°C	Location Lat. (N)	Long. (W)	Depth (m)	Current Direction	origin speed (knots
0600							066°	1.1
0620	34.6	34.92	28.0	27° 50.96'	83° 40.76'		066°	1.1
0715	34.6			" 51.04'	" 35.24'	36	069°	1.2
0730				"	"		098	.6
0745	35.0	35.27		" 51.06'	" 32.24'			
0800				"	"		098	.6
0830				"	"		100	.5
0905	35.5	35.69	27.3	" 51.08'	" 23.6'			
0950							081	.3

Arrived St. Petersburg June 24, left June 25 for Drill Core No. 1 off Pinellas County, Florida (clearwater).

6/27/80

0403	33.9	34.08	26.1	26° 45.78'	84° 04.3'				
0615	32.9	33.38	28.3	" 24.83'	" 11.45'	170			
0715	33.6	33.95	28.2	" 16.10'	" 15.79'	183			
0910	35.0	35.34	28.5	26° 00.02'	84° 23.85'	213			
1010		35.43	28.3	25° 59.96'	84° 17.18'	190			
1120	33.6	35.58	28.2	" 59.97'	" 10.19'	190			
1630	34.3	34.62	29.3	26° 00.02'	83° 38.44'				
1750	34.8	34.91	29.5	" 00.06'	" 33.06'	75			
1840	34.6	34.68	29.6	25° 59.96'	" 23.08'	68			
2000	34.2	34.39	29.5	" 59.7'	" 13.9 '	66			
2200	34.4	34.98	29.2	" 59.97'	" 00.90'	52			
2300	35.8	36.01	29.3	26° 00.03'	82° 55.34'	40			

6/28/80

0027	36.0	36.18	29.1	" 00.02'	" 44.89'	40			
0125	36.2	36.40	29.2	" 00.0'	" 38.12'	30			
0230	36.1	36.27	29.0	25° 53.35'	" 37.91'	42			
0415	35.8	36.00	28.8	" 50.09'	" 46.38'	46	036°	.9	
0520	36.0	36.14	29.0	" 49.95'	" 53.51'	52	0		
0640	35.4	35.79	29.0	" 50.40'	83° 03.6'	56	(0700-0730)	110	1.1
0825	35.0	35.05	28.8	50.03'	" 15.78'	65	030°	.9	
0940	34.2	34.52	29.3	" 49.99'	" 24.93'	71			
1040	34.7	35.21	29.1	" 50.07'	" 32.23'	78			
1140	34.4	35.00	29.1	" 49.90'	" 37.65'	76			
1313	32.8	34.68	29.1	" 50.12'	" 46.18'	90			
1405	33.9	34.16	28.8	" 49.87'	84° 00.75'	115			
1456	33.7	33.91	28.9	" 49.90'	83° 55.41'	127			
1540	33.7	33.71	29.3	" 49.87'	84° 00.75'	140			
1621	33.6	33.63	29.1	" 50.04'	" 05.32'	145			
1702	34.6	34.69	29.5	" 49.85'	" 10.34'	157	210°	.8	
1755	35.9	35.38	29.7	" 49.98'	" 15.28'	160			
1847	35.5	35.48	29.6	" 50.15'	" 21.08'	188	010°	.6	
1920	35.3	35.45	29.6	" 50.18'	" 25.22'	208			
1958	35.4	35.65	29.8	49.98'	" 30.09'	227			
2039	35.8	35.95	30.1	" 50.05'	" 35.26'	377			
2122	35.2	35.76	30.2	" 50.1'	" 40.62'	746			
2203	34.5	35.41	30.0	" 50.01'	" 45.99'	1163	107°	1.4	

Time (GMT)	S o/oo sal.	S o/oo ref.	T°C	Location Lat. (N)	Location Long. (W)	Depth (m)	Current Direction	Current speed (knots)
2330 end line 13	35.3	35.42	29.7	25° 50.19'	84° 57.06'	3329		
6/29/80								
0121	35.6	35.60	28.7	" 39.95'	" 57.98'	3343		
0232	35.3	35.32	29.2	" 40.06'	" 49.16'	1500		
0306	35.2	35.36	29.2	" 40.04'	" 44.74'	1200		
0338	35.3	35.32	29.1	" 39.99'	" 40.09'	950		
0408	35.6	35.69	29.2	" 40.08'	" 35.70'	619	(0430)	170° .3
0520	35.8	36.07	29.2	" 40.10'	" 25.79'	225	(0500)	180° .4
							(0530)	180° .5
0645	34.7	34.98	29.3	" 40.18'	" 12.42'	170	0600	190° .6
							0630	175° .6
0700				"	"			210° .8
0730	33.7?	35.65	28.8	40.0'	5.53'	149		240° .8
Set of current data apparently inconsistent with previous numbers: June 29 0430 170° .3; 0500 180° .4; 0530 180° .5; 0600 190° .6; 0630 175° .6 ; 0700 210° .8; and 0730 240° .8.								
0835	33.8	33.95	29.1	25° 40.15'	83° 56.43'	136	298°	.8
0918	34.2	34.69	29.2	" 40.33'	" 49.78'	115	232°	.5
0950	35.0	34.98	29.5	" 40.20'	" 45.45'	103	221°	.5
1025	35.0	34.94	29.5	" 39.97'	" 38.22'	87	222°	.7
1118	34.4	34.54	29.4	" 40.00'	" 33.47'	78		
1147	34.4	34.52	29.4	" 39.93'	" 28.95'	74		
1248	34.6?	34.96	29.6	" 39.97'	" 19.26'	67		
1354	35.3	35.25	29.5	" 39.97'	" 10.07'	54		
1513	35.7	35.83	29.6	" 40.06'	82° 59.70'	47		
1600							125°	.7
1630							100°	1.2
1652 end line 15	34.8	35.13	29.13	" 38.96'	" 49.10'	41	160°	1.3
1800							165°	1.6
1822	35.2	35.34	30.3	" 29.98'	" 50.71'	43	165°	1.6
1944	35.0	35.29	31.1	" 30.41'	83° 01.35'	50	125°	.7
2045	34.5	34.72	30.8	" 30.16'	" 08.87'	54	130°	1.2
2145	34.5	34.75	30.8	" 30.06'	" 17.37'	59	200°	1.4
2330	34.6	34.79	30.7	" 30.07'	" 30.22'	68	069°	1.5 (~2300) getting carried N" 1 kn?)
30 June								
0057	34.2?	34.49	29.9	" 29.90'	" 41.93'	82		
0158	33.9	34.49	29.9	" 29.89'	" 50.48'	108	(0200)	057° .6
0318	33.6	33.67	29.7	" 29.60'	84° 01.45'	137		
0430	34.7	34.76	29.7	" 29.50'	" 10.49'	164		022 .5
Ron Johnson: line 11 83 45 sudden current to N								
0540	34.3	34.63	29.5	25° 29.80'	84° 20.36'	157		124 .2
0640	35.6	35.66	29.3	" 30.08'	" 28.36'	366		108 .4
0700								090 .2
0800	35.0	35.15	29.00	" 30.02'	" 39.13'			056 .2
0925	35.3	35.47	28.7	" 27.88'	" 47.61'	2600		
1035	35.0	35.22	28.5	" 20.92'	" 45.83'	3000		

Time (GMT)	S o/oo sal.	S o/oo ref.	T°C	Location Lat. (N)	Long. (W)	Depth (m)	Current Direction	origin speed (knot
1438	34.2	34.48	29.1	25° 18.01'	84° 19.72'	147		
549	33.8	34.13	29.1	" 17.81'	" 09.92'	147	303°	7*
1707	33.7	34.17	29.4	" 17.23'	83° 58.95'	128	336°	1.0*
1825	34.3	34.48	29.6	" 17.77'	" 48.43'	105	336°	.7*
1932	35.2	35.11	29.7	" 18.05'	" 39.59'	75	358°	.5*

Currents (extra data) 1630 314 1.1; 1830 336 .7; 1900 332 .5. Tim Nelich calculated these on the bases of mean directions and currents. .5 kt error in estimated speed in still water will introduce 45° error in det.

2157	35.30	35.1	29.3	25° 17.97'	83° 20.86'	62	
2323	35.51	35.3	29.7	" 18.10'	" 10.16'	57	

1 July 1980

0007 end line	35.19	35.0	29.2	" 17.80'	" 04.97'	55	
0153 19	35.29	35.4	29.6	" 10.00'	" 10.66'	57	
0400							286° .4*
0430	34.73	34.3	29.2	" 09.96'	" 30.70'	69	270° .4*
0500				" 10.03'	" 34.38'		270° 0.6*
0530				" 10.03'	" 37.42'		270° .6*
0600				" 10.02'	" 47.26'		320° .3*
0605	34.83	34.3	29.2	" 09.88'	" 41.92'	82	
0630				" 09.68'	" 41.26'		357° .4*
0700				" 09.62'	" 48.93'		332° .8*
0730	34.00	33.8	29.0	" 09.91'	" 52.79'	115	019° 1.0*
0800				" 09.83'	" 56.70'		
0815				" 09.9'	" 58.7'		298° 0.8*
0845 (40)	33.80	33.6	28.8	" 09.52'	84° 02.59'	140	210° 0.8*
0915				10.0'	" 06.65'		232° 0.5*
0945				" 10.0'	" 10.7'		221° 0.5*
1005	34.34	34.1	28.9	" 10.01'	" 12.79'	160	
1015				" 10.0'	" 14.9'		222° 0.7*
1107	34.37	34.0	29.1	" 10.0'	" 21.09'	410	
1419	35.66	35.5	28.7	" 08.52'	" 45.29'	3400	
1537	35.59	35.4	28.6	24° 59.98'	" 40.20'	3375	
1710	35.49	35.2	29.2	" 59.95'	" 27.96'	1875	
2010	34.26	34.0	29.4	25° 00.06'	" 04.75'	140	
2233	34.43		29.5	24° 50.54'	" 10.31'	390	

* = high quality estimates

2 July 1980

0950	34.28		28.6	24° 50.29'	83° 50.89'	75	
1046	34.63		28.9	24° 45.97'	" 53.75'	186	
1148	34.65		28.9	24° 41.30'	" 58.90'	900	

3 July 1980

0400				25° 00.16'	" 12.23'		151° 1.4
0430				25° 00.10'	" 08.91'		149° 1.1
0500				24° 00.11'	" 05.67'		149° 1.1
0510		35.3	29.2	25° 00.01'	" 04.67'	52	
0530				24° 58.10'	" 4.88'		174° .8
0600				24° 55.62'	" 4.75'		181° 1.8
0630				24° 52.63'	" 4.64'		107° 1.1
0700				24° 40.22'	" 4.55'		218° .6
0730				24° 46.02'	" 4.81'		210° .6

Time (GMT)	S o/oo sal.	S o/oo ref.	T°C	Location Lat. (N)	Long. (W)	Depth (m)	Current Direction	Current speed (kno
3 July 1980 Continued.								
0800		36.0	29.3	24° 42.78'	83° 04.76'	50m		
1000		34.5	29.1	24° 30.37'	83° 04.71'	40m		
1128		34.3	29.2	24° 20.09'	83° 04.52'	290m		
4 July 1980								
0055		34.5	29.5	24° 24.47'	82° 59.56'	100m		
0225		34.4	28.4	24° 21.80'	83° 88.52'	58m		
0600		34.2	29.2	24° 30.32'	83° 29.88'	245m		
0645	34.73	34.3	29.0	24° 34.97'	83° 23.70'	60		
0730	34.52	34.2	29.3	24° 39.63'	83° 25.75'	60		
0830	34.60	34.2	29.2	24° 45.81'	83° 23.17'	64		
1005	35.00	34.7	29.2	24° 41.97'	83° 16.15'	60		
1114	35.15	35.0	29.3	24° 35.41'	83° 06.38'	36		
1430	35.30	35.2	28.9	24° 25.11'	82° 51.85'	53		
5 July 1980								
0352		35.4*		24° 30.42'	80° 44.83'	-	-	-

*Incl. correction factor

DREDGE LINES 1 and 2 (NEAR TORTUGAS BANK, SE GULF)

F.T. Manheim, P.C. Bowker and Ray Hall

The objective of these lines was 1) attempt to confirm the nature of hard rock outcrops reported by J.D. Milliman on Submersible NR-1 at approximately 24°49' and 84°10', around 200 m. depth, with special emphasis on the possibility that the rocks are westward extensions of the Mid-Tertiary phosphoritic strata found in the Pourtales Terrace, S. of the Florida Keys; and 2) establish the stratigraphic succession of rocks outcropping at the edge of the shelf in order to improve correlation of geophysical data and understand the subsurface stratigraphy of the W. Florida Shelf:

Line 1 crossed the slope from 24°44.5'N to 84°16.0'W at depths of 170 to 1700 m, respectively. 7/01/80, 2052-2330 (see also location sketch).

Statistics and data on the dredge runs as follows:

Haul #1: (URI rocking chair clam dredge, modified with 3/4" steel plate under teeth). See special notes and separate memos.

Overboard 0107	24°48.26'	84°12.49'	Depth 850m	0123/2 July
On bottom 0124	24°48.16'	84°12.23'	" 875m	0230
Off bottom 0155	24°48.20	84°11.73	" 875m	

Surficial greenish sandy carbonate-rich mud, silty to clayey in part, soft. Some living and dead organisms including a deepwater coral fragment. No phosphate test. Luxuriant planktic foraminiferal assemblage of Pleistocene-Holocene (paleo notes by R. Hall).

Globigerinoides ruber	Pulleniatina obliqulaculata
Globorotalia menardii	Globorotalia truncatulinoides
Globigerinella aequilateralis	Neogloboquadrina dutertrei
Globigerinoides sacculifer	Globigerinoides conglobatus
Orbulina universa	Globorotalia tumida

Worm tubes, sponge spicules, bivalves, gastropods, echinoid spines, benthic foraminifera: Cibicides, Uvigerina, etc.; significant amount siliceous organisms (sponges, diatoms) preservation excellent.

Haul #2: same dredge as above. several liters recovery

On bottom	24°49.32'	84°11.71'	Depth 530m
Off bottom	24°55.84'	84°11.67'	" 460m

Grayish-green, sandy-silty carbonate sediment with brittle stars, shells and piece of klinker from coal-burning steamship; general character as above. Faunal assemblage as above, with slightly larger percentage of silica. Note, these sediments are probably only thin surficial layers, since sparker shows outcropping strata. Age: Pleistocene-Holocene.

Haul #3: same dredge as above

On bottom	24°54.63'	84°05.21'	Depth 212m
Off bottom	24°55.00	84°04.70'	" 180m

Dredged weak link snapped from strong pull around 205 m. Unit was brought to surface, but just as it was being manipulated on board the frame, which consisted of steel tubing with threaded rod inside, parted, plunging the dredge back into the briny. Before it did so, rocks having a buff-color and globular character similar to samples from Haul #4 were seen in the dredge bag.

Haul #4: Backup dredge, a rake-type clam dredge with 2½-inch teeth, and coarse chain basket lined with burlap was employed. The previous station was repeated.

On bottom	24°54.51'	84°05.51'	Depth 220m
Off bottom	24°51.97'	84°04.95'	" 205m

The previous dredge grabbed part of the top of a shallow embankment, whereas this dredge recovered materials on low-relief mounds seaward of the "cliff" as seen on seismic traverses.

Recovered full basket (several bushels) spheroidal tennis ball-to-grapefruit size algal reef rock nodules and lumpy aggregates. The samples were separated into five categories: new (fresh) material, nodules, water-worn nodules, weathered nodules, and organic-stained nodules. No phosphate reaction. After retaining several buckets of material the rest were dumped.

The rocks have undergone cycles of cementation, leaching; and it is difficult to distinguish original material from surficial fauna that has infiltrated via burrow and pores. The freshest nodules were covered with encrusting forms, including siliceous sponges, brachiopods, encrusting forams, soft corals?, hydrozoans?, bryozoa, etc., brittle stars, worms, etc. Forams extracted from macerated samples included: 1 red G. ruber, 1 G. tumida, 1 P. obliquloculata, 1 N. dutertrei, 1 white G. ruber. Age is Pleistocene-Recent.

It is impossible to tell what age original algal reef material was at this time, but C. Holmes suggests they may be slumped remains of Pleistocene reefs.

Haul #5: On bottom:	24°54.90'	84°04.8'	Depth 205m
Off bottom:	24°55.10'	84°04.65'	" 178m

The samples contained several massive plates of algal rock carbonate about 5-8 cm thick and 20-30 cm wide. The top surface is heavily encrusted with benthic organisms, and inside were boring organisms that emerged. The top was also iron-stained, and coated with a black organic residue in part. The rock was otherwise similar to the previous one.

Dredge line #2 Lat. 24°37.25'N to Long. 84°4.5'W; depths 1200-80m
7/2/80 0956-1130

Haul #1: On bottom:	24°41.30'	83°59.26'	
Off bottom:	24°41.49'	83°59.33	735m
2000 pull at	24°41.42',	83°59.28'	787m

Recovered several liters greenish-gray clay with some shell hash and organisms. No phosphate reaction. Soft sediment has same faunal assemblage as Dredge 1, Haul 1.

Pleistocene-Holocene.

Haul #2: On bottom 24° 41.98'83°59.10' 625 m
Off bottom 24° 42.25'83°59.01' 546 m

Strong tug at 24°42.26'83°58.99'

Recovered small amount of greenish-gray, sandy shell hash, large fragment of encrusted, brown-stained deepwater coral, piece of dirty buff carbonate outcrop with white broken surface, partly bored: 8x4x3 cm. Phosphate test on sediment very faint, faint on fresh rock face and negative on black-brown staining. Negative on attached fresh brachiopod shell.

(Comments on haul by Scott Brande):

Calcified worm tubes, agglutinated annelid tubes with mm-sided material (sponge spicules, forams, grains on surface of bottom sediment. Coral surface seems recently dead, not heavily bored nor over 50% covered by epibionts. Coral fragment not greatly abraded or eroded, hence is probably close to growth site.

Haul #3: On bottom 24° 42.68' 83° 57.45' 463 m.
Off bottom 24° 42.79' 83° 57.38' 460 m.

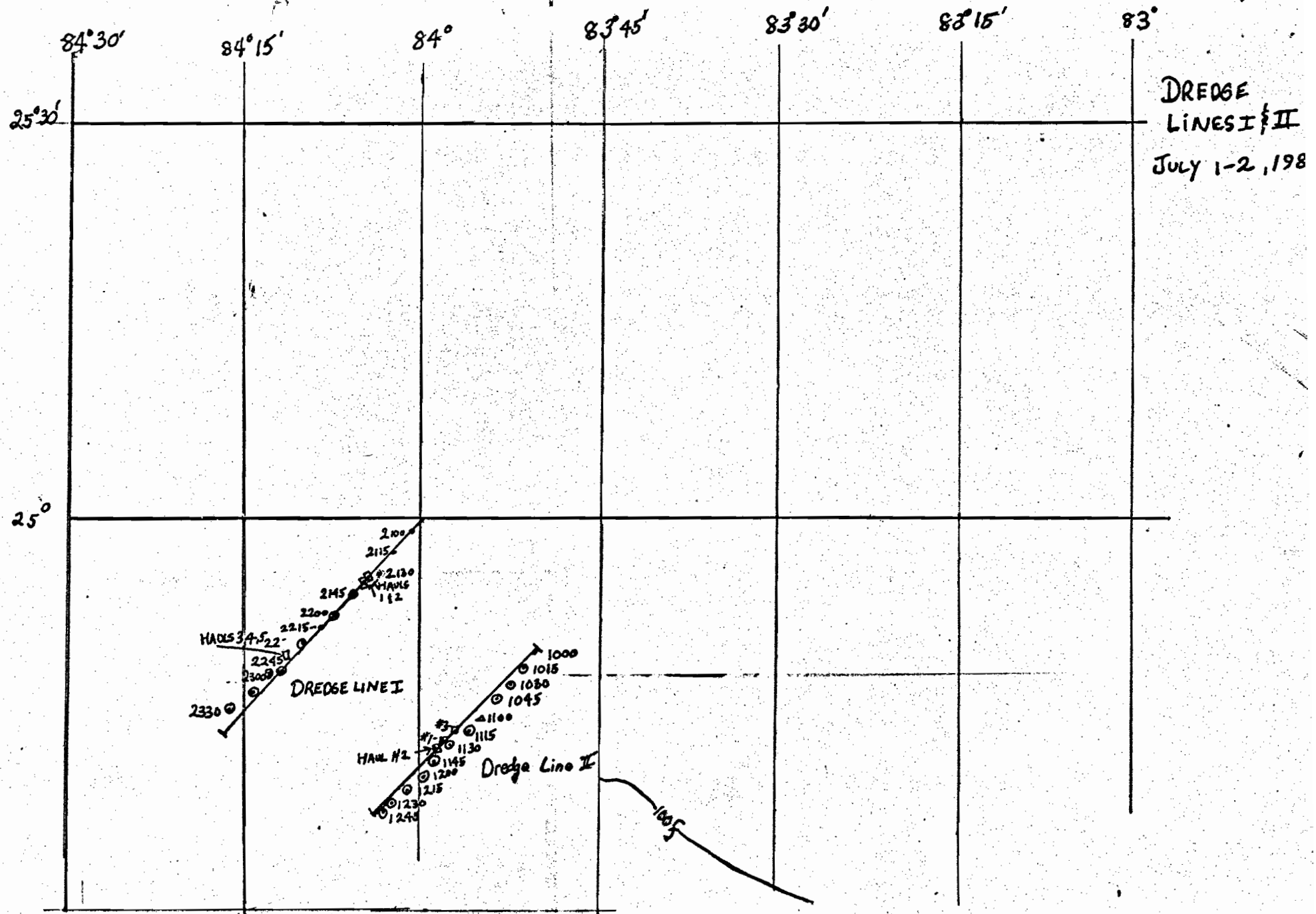
Tugs at 24° 42.92' 83° 57.27' 420 m. Tool hung up on bottom, snapped weak link and still resisted recovery. After 30 minutes manipulation by Theo Duis, dredge was recovered with badly bent frame 11,000-lb pull.

Recovered pieces of sheared carbonate material, shells and organisms. Faint phosphate test on sheared pebble and other surfaces. Not significant. Organism suite as in previous sites: Pleistocene-Recent.

COMMENTS ON DREDGING AND EQUIPMENT

As pointed out by Texas A&M Senior Marine Technician, Theo Duis, the dredges supplied by URI were completely inadequate for the rock dredging, both being intended as clam dredges. The rocking chair dredge, lost on Dredge Line 1, not only had long teeth which posted an immediate threat of becoming an "anchor" for the ship and were modified by welding on a steel plate, but was in poor condition and had a weak tubular frame. URI technician, Wayne Fissett had never been to sea and had only worked for URI for six weeks when assigned to the task. We were lucky to have the help of experienced and inventive TAMU Technician, Theo Duis. He placed his weak link and safety bridle in such a way that we not only recovered the dredges, but at least for dredge no. 2 recovered parts of the contents after the dredges got hung up on rocks. In each case the hard substrate was a Pleistocene reef rock, probably displaced downward by slumping.

This series of dredges revealed nothing about underlying strata, at least until further studies of the rocks are done. In future work we propose that proper rock dredges be used, coupled with "dart corer" that is able to penetrate through several feet of soft sediment before capturing a section of hard material. Such a corer may also help identify bedrock in the shelf proper.


84°30'
84°15'
84°
83°45'
83°30'
83°15'
83°
25°30'
25°
DREDGE LINES I & II
JULY 1-2, 198
2100
2115
#2130
HAULS 1 & 2
2145
2200
2215
HAULS 3-4-5
2245
2300
2330
DREDGE LINE I
1000
1015
1030
1045
1100
#3
1115
#1
1130
HAUL #2
1145
1200
1215
1230
1245
Dredge Line II
100 f

PALEONTOLOGIST'S REPORT

Ray Hall

Doyles' piston core catcher samples

Twenty-four piston core catchers were analyzed to determine the ages of the oldest sediments at each site. Common Pleistocene-Holocene planktic foraminiferal assemblages were encountered at all 24 sites, with sediments from core catchers 19-27 being considered to be Pliocene/Pleistocene due to presence of Globorotalia toesensis (a Pliocene form, along with G. truncatulinoides).

Common Pleistocene-Holocene species encountered on the 250 u mesh are:

Globorotalia truncatulinoides
" menardii
" crassula-crassaformis group
Globigerinoides ruber (red and white var.)
" sacculifer
" conglobatus
Neogloboquadrina dutertrei
Orbulina universa
Globigerinella aequilateralis

Special assemblages of interest include:

1. Core catcher, site 5 and the base of Core 6 may contain the Globorotalia flexuosa zone indicative of the Sangamonian

2. In core catcher two Turborotalia inflata (cool water form) is one of the dominant species in the assemblage.

3. Core catcher 9 and 11 possibly contain Globoratalia ungulata which is a Holocene indicator. The sediments from the same two sites also contain the only identified Spharoidinella at the piston core sites.

Area I phosphate prospect

Three box cores, 5 Smith McIntyre grab samples, 2 piston core catchers, and one gravity core sample were analyzed for age dates in the region east of the Mississippi delta and W. of DeSoto Canyon.

P-1/BC 1 Pleistocene-Holocene 250 u mesh
Globorotalia menardii
Orbulina universa
Globigerinoides sacculifer
" ruber (both var.)
Neogloboquadrina dutertrei
Pulleniatina obliquiloqulata
Globorotalia truncatulinoides

P-2/S-M 1 Pleistocene-Holocene 150-250 u mesh
Globobigerinoides ruber (red)
Globorotalia truncatulinoides
Cibicides spp
Globorotalia ungulata

P-3/SM2 Pleistocene-Holocene 150-250 u mesh
Globigerinoides ruber (red)
Globorotalia ungulata
Lagena sp
Gaudryina sp
Quinqueloculina sp
Articulina lineata
Elphidium sp

P-4/B.C. 1 Probably Pleistocene-Holocene; mostly clastics

2 Globigerinoides ruber (red)
2 Quinqueloculina

P-5/B.C. 1 (4-9 cm) Pleistocene-Holocene
Globoratolia truncatulinoides
Globigerinoides ruber (red)
Neogloboquadrina dutertrei
Globigerinoides sacculifer
Orbulina universa
Pulleniatina obliquloculata
Articulina magra
Quinqueloculina spp.
Pyrgo sp.

Samples from two drill core sites

Drill Station (Site 1): recovered 61 cm chiefly hard calcareous rock. An attempt was made to free individual grains from a 50-54 cm sample using a freeze-thaw method. This method was successful in freeing individual grains but yielded only about 10 planktic foraminifera, all which were <150 u in size. The planktic foraminifers were not diagnostic, and no age could be determined.

Drill Station (Site 2):

1. Dart (gravity) core: Pleistocene
2. Smith-McIntyre 1: Pleistocene
   Asterigerina carinata
   Gaudryina aequa
   Agglutinated forms
   Articulina lineata
   Peneroplis bradyi
   Quinqueloculina spp.
   Elphidium spp.
   Cibicides spp.
   Globigerinoides ruber (red)

3. Smith-McIntyre 2: 8-12 cm horizon: Pleistocene

Gaudryina aequa
Peneroplis bradyi
Quinqueloculina spp.
Agglutinated forms
Asterigerina carinata
Elphidium sp.
Cibicides ? lobatulus
Florilus sp.

4. Smith-McIntyre three bottom: Pleistocene

Articulina lineata
Peneroplis spp.
Gaudryina aequa
Agglutinated forms
Quinqueloculina spp.
Asterigerina carinata